

REMARKS

§ 112 Rejections

Independent Claims 1, 10, 20, 26 and 32

The Examiner rejected independent claims 1-35 as being indefinite. Claims 1, 10, 20, 26 and 32 have been amended to include structure of a semiconductor material so that the semiconductor material exhibits the claimed property. In particular, each of the independent claims includes a semiconductor material having a band-gap larger than the energy of a photon at the operative wavelength and smaller than twice the energy of a photon at the operative wavelength, and having a position with respect to the electric field pattern and a thickness such that the semiconductor material provides increasing absorption of radiation at the operative wavelength as energy density of radiation within the semiconductor material increases, to enhance stability of the mode-locked output.

§ 102 Rejections

Independent Claims 1, 10, and 26

The Examiner rejected independent claims 1, 10, and 26 as anticipated by Spuhler (Electronics Letters, 1 April 1999). Each of claims 1, 10 and 26 requires a semiconductor material having a band-gap larger than the energy of a photon at the operative wavelength and smaller than twice the energy of a photon at the operative wavelength, and having a position with respect to the electric field pattern and a thickness such that the semiconductor material provides increasing absorption of radiation at the operative wavelength as energy density of radiation within the semiconductor material increases, to enhance stability of the mode-locked output.

The Spuhler article does not disclose these elements of claims 1, 10, and 26. Spuhler simply describes a "passively mode-locked diodepumped bulk Er3+:Y3+:glass laser." (Spuhler, p. 569.) Spuhler's reflector includes an AlAs/GaAs backmirror with four InGaAs quantum wells grown on top of the backmirror for saturable absorption. In the office action, the Examiner labels the final GaAs layer of Spuhler's backmirror as a "semiconductor element 30." However, nowhere does Spuhler disclose or suggest that the backmirror or any other structure includes a

semiconductor material having a band-gap larger than the energy of a photon at the operative wavelength and smaller than twice the energy of a photon at the operative wavelength, and having a position with respect to the electric field pattern and a thickness such that the semiconductor material provides increasing absorption of radiation at the operative wavelength as energy density of radiation within the semiconductor material increases, to enhance stability of the mode-locked output. Instead, the final GaAs layer of Spuhler's backmirror is a thin layer falling near a null in the electric field pattern shown in Spuhler's Fig. 2.

These claims, therefore, are patentable over Spuhler. Claims 2-9 depend from claim 1 and are patentable for at least the same reason that claim 1 is patentable. Claims 11-19 depend from claim 10 and are patentable for at least the same reason that claim 10 is patentable. Claims 27-31 depend from claim 26 and are patentable for at least the same reason that claim 26 is patentable.

§ 103 Rejections

Independent Claims 20 and 32

The Examiner rejected independent claims 20 and 32 as obvious over Spuhler in view of Shen (U.S. 5,764,679). According to the Examiner, Spuhler satisfies all elements of the claims except for active mode-locking. Applicants disagree. As discussed above, Spuhler does not disclose a semiconductor material having a band-gap larger than the energy of a photon at the operative wavelength and smaller than twice the energy of a photon at the operative wavelength, and having a position with respect to the electric field pattern and a thickness such that the semiconductor material provides increasing absorption of radiation at the operative wavelength as energy density of radiation within the semiconductor material increases, as required by each of claims 20 and 32.

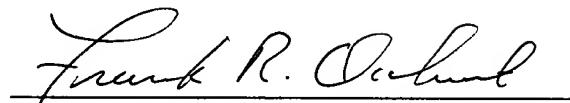
These claims, therefore, are patentable over Spuhler, and Shen does not supply the deficiencies of Spuhler. Claims 21-25 depend from claim 20 and are patentable for at least the same reason that claim 20 is patentable. Claims 33-35 depend from claim 32 and are patentable for at least the same reason that claim 32 is patentable.

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